September 27, 2021

Mr. Imaikalani Aiu
Town Planner
Town Hall
Weston, MA 02493

RE: Riverside Laboratories, Riverside Road, Weston
Preliminary Peer Review comments

Dear Mr. Aiu:

With reference to the Riverside Road redevelopment project, I offer the following preliminary comments to assist the project engineer in moving the project forward.

GENERAL COMMENTS

1. The site/civil plans and supporting documentation were not well vetted or internally reviewed by the civil engineering consultant. The HydroCad Analyses for hydrologic impacts failed to correctly "turn on" the infiltration/exfiltration computer analysis. As such, none of the proposed condition models account for infiltration and they indicate that site flooding occurs for most storm events. For example, the model for the 100-year storm event indicates that the surface parking lot along Park Road floods to a depth of 1.2- feet and that 1.4-acre-feet of water is discharged offsite through an imaginary spillway. Likewise, the model indicates that the garage structure will be flooded for storms at or above the 25-year design frequency, as the water surface in the infiltration system exceeds the rim elevation of an adjacent drain catch basin. The 100-year analysis indicates that nearly all the manhole rims on drainage structures will be blown off by hydraulic pressure. None of these flooding situations will occur, as the model is not an accurate reflection of the proposed drainage system and conditions, but they are illustrative of the lack of internal review these plans received. Based on the modeling errors, it is probable that the proposed drainage systems have not been properly sized. This is the case for all the proposed drainage systems and the model used to size them. The drainage system design will require revisions based on the application of a corrected HydroCad model.

2. The plans fail to provide adequate details of the proposed drainage systems and where details are provided, they conflict with both the model and the plans. For example, the site plans call for "Storm Trap" Single units to be used as infiltration chambers, yet the provided detail and the HydroCad model call for Double units. The only detail provided for the Storm Trap units (Sheet C6.103) is purely generic and is not the unit specified. The detail calls for the infiltration systems

to be installed on a reinforced concrete base. This would preclude any infiltration of stormwater and render the entire system non-functional.

3. The drainage system design for the Phase II and Phase III also fail to account for various minimum offset requirements between drainage system components and components for the proposed wastewater treatment plant. MADEP has specific requirements that must be satisfied for Small Wastewater Treatment Plants, as outlined in in a document published by MADEP titled *"Guidelines for the Design Construction, Operation and Maintenance of Small Wastewater Treatment Facilities with Land Disposal",* last revised in 2018. The drainage plan(s) as proposed fail to meet many of these requirements.

The short comings discussed above are disappointing, as a significant amount of my time was wasted in this first review and another full review will be necessary once these issues are addressed.

PHASE I: 20 Riverside Road

1. The existing Title 5 sewage disposal system is being upgraded to a small wastewater treatment plant under the MADEP Ground Water Discharge Regulations, 314 CMR 5.0. The design requirements for small wastewater plants, with discharges between 10,000 gallons per day (GPD) and 150,000 GPD are provided in a document published by MADEP titled "Guidelines for the Design Construction, Operation and Maintenance of Small Wastewater Treatment Facilities with Land Disposal", last revised in 2018. I have attached excerpts from this document to this memo. This issue is important both for Phase I and Phase II, as the design requirements for the Wastewater Treatment plant may have implications on other aspects of the site design. In particular:

a. Table 2 on page 43-444 of the Design Guidelines requires a 10-foot separation between potable water supply lines and all subsurface tanks; the plan as presented does not meet this requirement.

b. A building is required for all wastewater treatment plants that, as a minimum, houses all pumps, blowers, electrical controls, and chemical feed systems.

c. If waivers are being sought from MADEP from these requirements, the applicant should provide documentation to the Planning Board that the waivers have been granted. Alternatively, if the plans require changes based on MADEP review, the planning board will need to approve the changes, and, if needed, approve the location and design of any buildings associated with the treatment works.

2. Confirmatory soil testing is required at the proposed location of the infiltration leaching basin.

3. The inlet grate on the leaching chamber should be removed and a separate catch basin with a deep sump should be used to collect stormwater and remove sediment and fines prior to discharge to the infiltration chamber.

4. There is a drainage low point in the parking field (west side of building, fourth row of parking to the north of Riverside Road, easterly most space). Most of this parking field pitches to this point which the existing condition plan identifies as elevation 66.20-feet. Some means to drain this parking field should be provided. I note, however, that the proximity to the subsurface sewage disposal field will preclude the placement of a structure in this location.

5. The Stormwater Operation and Maintenance Plan is inadequate for a project of this scope. The O & M plan should be a stand-alone document applicable for each building or facility and, at a minimum, should include the following:

a. A complete site plan or map clearly identifying each drainage component on the site, both existing and proposed. The plan should identify the size, invert elevation and type of all drainage pipes, the location of and type of any water quality treatment devices, sub-surface structures, roof drain connections, and any other physical components of both the existing and prosed drainage system components. This plan depict drainage systems exclusively so as to ensure clarity and facilitate maintenance of the various components.

b. The O & M plan should address street and parking lot cleaning requirements.

c. The O & M Plan should address parking lot de-icing needs including the anticipated use of sand and sodium-based deicing agents. If snow storage is proposed within parking areas, the plan should identify receiving catch-basins and provide guidance on control and impact of sediments and deicing compounds on the maintenance requirements of the impacted structures.

d. The O & M Plan should address care, inspection and maintenance of landscaped areas, exposed slopes, and general groundskeeping.

e. The O & M plan should address inspection, maintenance, and operation of the existing stormwater basin, including sediment removal, vegetation control and invasive species management.

f. The O & M plan should identify required personnel and qualifications for inspections and maintenance activities. Presumably different expertise is required to evaluate the performance of the systems as opposed to cleaning the systems.

g. Annual reporting of inspection and maintenance activities should be documented.

6. Snow storage areas should be identified on the plans. If parking areas are to be utilized for snow storage, the number of spaces impacted should be identified, as well as the duration of the impact. I recommend that the analysis be based on a snowstorm with a depth of 24-inches.

7. The Site Photometric Plan for lighting needs to identify the type of fixtures proposed as well as mounting heights, base height, bulb types and shielding requirements. All fixtures should be

dark-sky compliant. Also, the plans do not identify the existing fixtures within the existing parking areas, driveways, service drives and roads. If existing light fixtures are to remain in service, those fixtures should be documented along with any new fixtures. Again, all lighting fixtures should be dark sky compliant as well as energy efficient. I understand that the Planning Board will engage a qualified lighting consultant to comment on the lighting plan,

8. I note that the plans call for all landscaped areas to be 100% irrigated. I defer to the Board to provide guidance on this topic.

9. The plans should identify the number and location of EV charging stations and identify required utility construction to construct the EV stations.

PHASE II/III: 9 Riverside Road and 15 Riverside Road

My comments on the Phase II submittal are as follows:

1. Please provide a plan that documents the land surface treatment used in the hydrologic analysis. The analysis indicates 77,183 SF of crushed stone area in the existing condition model (EX-2A and EX-3) and 76,334 SF of crushed stone in the developed condition model (PR-1, PR-2A and PR-3). Similarly, please document on a plan the areas classified as Woods-Poor, Woods-Fair, and New Landscaped in both the existing and developed condition models.

2. Given the fact that the Phase II and Phase III projects include the construction of a new Wastewater Treatment Plant, (WWTP) it is very likely that MADEP will require full compliance with the MADEP Design Guidance Manual. It is thus possible that a building to house some or all of the wastewater system components will be required. This issue should be resolved early in the planning board review process, as the location and design of a treatment building will likely have significant impacts on other aspects of the development.

3. The current design presents significant conflicts between the stormwater management systems, wastewater systems and potable water systems that will, in my opinion, necessitate consequential design changes that will lead to further project review. The following list identifies some of these conflicts but may not fully capture all the design conflicts and issues:

a. The wastewater soil absorption field must be at least 25-feet away from all drains, infiltration areas, catchbasins and stormwater conveyance structures. The plans do not satisfy this requirement.

b. The water supply lines must maintain a minimum of 10-feet of separation to all wastewater tanks and wastewater conveyance systems. If this separation is not possible, the sewer line must be designed so that the crown of the sewer pipe is a minimum of 18-inches below the invert of the water line. The plans do not satisfy this requirement.

c. The wastewater conveyance systems must maintain at least 10-feet of separation from all sub-surface drains and 5-feet of separation from stormwater infiltration basins. The plans do not satisfy this requirement.

4. The proximity of the wastewater disposal field to the proposed stormwater infiltration system located on the south and west sides of the building at 9 Riverside Drive raises a concern over the interaction of the two systems. While a design of the wastewater soil absorption system has not been provided, I can infer from the distribution box invert that the field will be at or below elevation 65-feet. The hydrologic analysis for the infiltration system indicates that during a 10-year storm event, the water level in the infiltration system will rise to an elevation of at least 65.9 feet, or approximately one foot higher than the wastewater disposal field and high enough to back stormwater into the sewage distribution box. The MADEP design manual requires (see page 44) that *"Where stormwater infiltration basins are proposed in proximity to an existing or proposed subsurface disposal system (SAS), the permittee shall provide documentation that no adverse impacts to the performance of the SAS shall result. The analysis should include assessment of stormwater infiltration of a one-year and ten-year storm, or otherwise based on peak design flows to the basin if flow controls are incorporated into the design."* This issue must be addressed before a full review of the stormwater management system is possible. This analysis will involve a groundwater mounding study of both the stormwater infiltration system and the wastewater deposal field using a groundwater model such as MODFLOW, or a similar model. The intent is to ensure that stormwater system does not interact with the wastewater disposal system.

5. As noted for Phase I, soil evaluations are required at each location proposed for infiltration. Additionally, since testing will likely be conducted by drilling rigs in a period outside normal high groundwater season, a Frimpter analysis to determine the Estimated Seasonal High Ground Water Table is required.

6. Stormwater discharged to the various infiltration systems requires a pre-treatment for sediment removal of at least 44 percent, prior to discharge into the infiltration system. The plans call for pre-treatment using a Baysaver Pretreatment proprietary system (Water Quality Units, or WQU) that claims a 50 percent treatment efficiency based on a Verification issued by the State of New Jersey Department of Environmental Protection. That NJDEP certification requires that the use and configuration of those devices meet specific conditions. Comments a through c, below, refer to the proposed stormwater treatment devices.

a. There are various models for the Baysaver system depending on anticipated flows. The plan detail only calls out the S6 unit. Will this unit be used everywhere?

b. The BaySaver system has a maximum allowable flow rate to achieve the 50 percent removal efficiency approved by the NJDEP. The design engineer will need to perform a hydraulic analysis to determine the inlet flow rate to each unit to demonstrate that the maximum flow rate is not exceeded. Based on the in-line design configuration selected by the design, the analysis will have to include all storm events, up to the 100-year event, to demonstrate that the flow rate is

not exceeded, and re-suspension of sediment will not occur in larger storm events. Alternatively, the water quality units could be placed in an offline configuration so flow to the treatment units is limited during large storms.

c. The water quality units (WQU) should be placed so that they have only one inlet. The present design has several WQU's with multiple inlets.

7. A WQU is required between Drain Manhole #222 and the infiltration system.

8. Drain manhole #219 should be a WQU.

9. Drain manhole #300 should be WQU rather than Drain Manhole # 301

10. A WQU is required between DCB #326 and DMH # 327.

11. DMH #312 should be a WQU, rather than DMH # 310.

12. DMH #304 should be a DCB.

13. DMH #311 should be a DCB.

14. DMH #315 should be a DCB.

15. The rim grade on DMH #306 is called for as elevation 0.00 feet. This is wrong.

16. DMH #12 has an 18-inch inlet pipe and a 24-inch outlet pipe, but no additional flow to require the increase in pipe size. From a hydraulic design viewpoint, this does not make sense. Please review the need for the pipe size increase, using an appropriate hydraulic computation. If the increase is needed, the elevation of the pipe crowns should be matched so that a backflow condition does not develop.

17. The drainage piping network to the east of the proposed parking garage and to the south of the new office buildings seems to be needlessly complex. The designer should review the network, make direct connections into the infiltration systems where possible, and reduce unneeded manholes and connecting pipes where possible.

18. Roof drainage connections from all buildings should be clearly identified. Roof drain lines should be piped directly to infiltration systems, rather into a piping network that runs through a WQU. Stormwater runoff from the roofs do not need to run through the WQU's and doing so reduces the efficiency of the WQU treatment.

19. Individual, system specific details should be provided for each Stormwater infiltration system. The details should identify the number and configuration of each Storm Trap unit to be used, as well as bedding requirements, stone requirements, if any, between rows, and backfill

requirements. The details should have all information necessary to construct the system(s). The details should be fully dimensioned in both plan and profile views.

20. Access structures should be provided into each of the Storm Trap infiltration systems wherever an inlet pipe is present, to facilitate both inspections of the systems and the removal of trapped sediment.

21. The same comments for the Operation and Maintenance Plan (O&M) provided in my Phase I comments apply to the Phase II/III submittal. A more robust, detailed O & M Plan is required. The O & M plan needs to be specific to the project, identify all drainage components (Including roof drain connections). It should also eliminate references to components not shown on these plans, such as "emergency overflow pipes".

As noted in my general comments section, I anticipate that this review will lead to substantive plan and documentation revisions, and these will necessitate an additional review. Accordingly, this initial review should not be considered complete or comprehensive, and I may have additional topics to discuss in a subsequent review.

Please feel free to contact me should you have any questions or if you require additional information.

Sincerely yours,

Robert A. Gemma, PE, PLS
President